

5.6 Action Plan for Technology 5: Ex-situ conservation for highly threatened species and possible reintroduction

5.6.1 Description of the Technology

Ex-situ conservation refers to conservation activities that occur outside the usual habitat of a species. Often this approach focuses on captive maintenance programs for species that would otherwise become extinct due to climate change. Such an approach would generally be a last resort for species⁷². Zoological Gardens, captive breeding centers, seed banks etc are some example of such conservation activities, and therefore not a new technology. However some advanced facilities may be necessary for certain species. Zoos and breeding centers have long been carrying out captive breeding, especially for keystone mammals. Sperm and egg banks would be rather extreme forms of this strategy, but may be necessary⁷³. Often such activities are carried out as insurance against future or unexpected threats that will make in-situ conservation difficult. Ex-situ conservation is usually not favored where in-situ conservation is possible, but its importance as an insurance mechanism is recognized. In some situations, ex-situ conservation will need to be carried out until global warming is reversed as the only chance of survival for some species. Ex-situ collections should have sufficient diversity to allow adaptation⁷⁴.

Several Policies, Action Plans and Strategies in Sri Lanka have identified this technology as essential for biodiversity conservation.

Some of its benefits are highlighted below:

- Environment - The main environmental benefit would be that this mechanism would contribute to the viability of threatened biodiversity, and genetic diversity.
- Employment – Expansion and up gradation of existing ex-situ conservation facilities, and creation of new facilities will provide employment opportunities during the planning and construction phase and for day to day activities. It will require support staff and also scientists and veterinarians.
- Investment - There will be medium to high capital investment requirements to upgrade existing facilities, and to establish new facilities.

⁷² Mawdsley, et al. 2009. Op. Cit.

⁷³ Mawdsley et al. 2009. Op. Cit.

⁷⁴ Noss, R. F. 2001. Beyond Kyoto: forest management in a time of rapid climate change. *Conservation Biology* 15:578–590.

- Income - Certain ex-situ conservation programs, especially those associated with zoos, botanical gardens and aquaria can generate significant income from tourists and local visitors. In fact they can accommodate larger number of visitors depending on the location and ease of visitation as carrying capacity will not be a limiting factor.
- Education - Zoos, botanical gardens and aquaria are excellent learning platforms for students of all ages and adults. It gives an opportunity to learn about both native and exotic species, and the ability to see a wide variety of species and obtain information, and usually have excellent interpretation centers. They also provide information on threatened species and importance of conservation, and play an important role in harnessing public support of biodiversity conservation in general.
- Health - There are no obvious health benefits from ex-situ conservation, but can contribute to good mental health and relaxation, as it is a recreational activity.

5.6.2 Target for technology transfer and diffusion

- Create at least two conservation facilities based on requirements and prioritization.
- Allocation at least 2-5% of annual budgets of the respective agencies for setting up ex-situ facilities that may be required in the near future.
- Introduce a framework/protocol for reintroduction and monitoring.
- At least 20 partnerships built with species specialists.
- Carry out capacity building on ex-situ conservation
- Standard protocols for ex-situ conservation (maintenance of facilities, disease control, quarantine etc) introduced.
- A study to identify and prioritize species for ex-situ conservation.
- Introduction of a regulated system to allow ex-situ breeding by non state parties under the close supervision of the government stakeholders.

5.6.3 Barriers to the technology's diffusion

Seven (07) key barriers comprised of three (03) economic & financial and four policy, legal & regulatory have been identified.

The list of key barriers and hierarchy classification for technology 5 is given in table 5.16.

Table 5.16: List of key barriers and hierarchy classification for the technology 5

Technology Name: Ex-situ conservation for highly threatened species and possible reintroduction			
No.	Key Barriers Identified	Priority Rank	Category of Barriers
1.	Low funding allocation for this technology (nationally).	1	Economic and financial
2.	Lack of proper planning and funding for ex-situ conservation, No framework/protocol for reintroduction and monitoring	2	Economic and financial
3.	Lack of expertise and resources (suitable land/specialized locations, standard protocols) to carry out ex-situ conservation	4	Economic and financial
4.	Ex-situ conservation of wild fauna not a high priority in conservation policies.	5	Policy, legal and regulatory, information & awareness
5.	Weak law enforcement for improper ex-situ conservation	7	Policy, legal and regulatory, information & awareness
6.	Existing legal framework permits ex-situ conservation by only few government agencies.	6	Policy, legal and regulatory, information & awareness
7.	Poor understanding on species that may require ex-situ conservation (at present or in the future).	3	Policy, legal and regulatory, information & awareness

5.6.4 Proposed Action Plans for Technology 5: Ex-situ conservation for highly threatened species and possible reintroduction

The Proposed Action Plan for Technology 5 is provided in table 5.17.

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Action Plan for Technology 5

Table 5.17: Proposed Action Plan for the Technology 5: Ex-situ conservation for highly threatened species and possible reintroduction

Measure/Action 1: Apportion a part of annual budgets of the relevant agencies for setting up ex-situ facilities that may be required in the near future*					
Justification for the action: There is a low funding allocation for this technology (nationally). Currently the main departments dealing with management of environment and biodiversity conservation in the country do not have financial provisions for this activity in their nationally allocated budgets. Non prioritization of this activity and insufficient finances from annual budgets is a major hindrance for ex-situ conservation, which is considered a high priority for biodiversity adaptation to climate change.					
Action /Sub Action	Priority Rank	Responsibility for Implementation	Time frame	Cost & Funding Source	Indicators
(i). Set aside a portion of annual budgets of Forest and Wildlife Departments for this technology based on action plans (ii). Seek external funds*	V. High	Wildlife Dept, Dept of National Zoological Gardens, Plant Genetic Resource Centre, National Botanic Gardens , NARA	Year 2	Domestic No additional funds required	- least 2-5% of budget allocated for the technology within 3 years
Measure/Action 2: Identify ex-situ conservation facilities required and prioritization and estimating costs .					
Justification for the action: There is a lack of proper planning and funding for ex-situ conservation. No framework/protocol for reintroduction and monitoring. Ex-situ conservation is usually considered a last resort for conservation, and thus it is an important technology for biodiversity adaptation. Ex-situ conservation requires proper advance planning to seek budgetary allocations.					

Action /Sub Action	Priority Rank	Responsibility for Implementation	Time frame	Cost & Funding Source	Indicators
(i). Identify ex-situ conservation facilities that are required , prioritize and estimate the cost.	V. High	DWLC, FD, National Zoological Gardens, PGRC, National Botanic Gardens & NARA	2 – 3 years	Domestic and international 2,000,000	- Priority list in 6 months - 2-5 Built facilities annually for 3 years.
Measure/Action 3: Introduce framework/protocol for reintroduction/translocation and monitoring.					
Justification for the action: Currently there is no framework or protocol for captive breeding, reintroduction, monitoring etc.,.					
Action /Sub Action	Priority Rank	Responsibility for Implementation	Time frame	Cost & Funding Source	Indicators
(i). Introduce framework/protocol for reintroduction/translocation and monitoring.	High	DWLC, FD, National Zoological Gardens, PGRC, National Botanic Gardens & NARA	2 – 3 years	Domestic and international US \$ 250,000	- At least 1 publication of best practices produced in 2 years. - At least 2-5 examples of best practices being used within 5 years.
Measure/Action 4: Carry out capacity building on ex-situ conservation*; partnerships with species specialists and facilitate exchange and sharing of knowledge; suitable resources and standard protocols					
Justification for the action: There is a lack of required expertise and resources (suitable land/specialized locations, standard protocols) to carry out ex-situ conservation. The resource requirements include suitable land and specialized location for certain species. Additionally it is vital to have standard protocols and procedures to carry out ex-situ conservation in the country. Without a combination of these skills, expertise and resources it would be difficult to carry out ex-situ conservation successfully.					
Action /Sub Action	Priority Rank	Responsibility for Implementation	Time frame	Cost & Funding Source	Indicators
(i). Carry out capacity building on ex-situ conservation*	High	DWLC, FD, National Zoological	Year 3,	Domestic and	- 2-5 Capacity building –

		Gardens, PGRC, National Botanic Gardens & NARA (Universities Environmental org)	thereafter annually	international US\$ 500,000	workshops annually with 25-50 stakeholders.
(ii). Partnerships with species specialists and facilitate exchange and sharing of knowledge	High	DWLC, FD, National Zoological Gardens, PGRC, National Botanic Gardens & NARA, (Universities Environmental org Species specialists)	Years 1-2	Domestic and international US\$ 150,000	- At least 10 partnerships formed in 2-5 years. - At least 5 partnerships have lasted more than 1 or 2 years.
(iii). Provision of suitable resources (eg: land etc).	V. High	DWLC, FD, National Zoological Gardens, PGRC, National Botanic Gardens & NARA	Year 3	Domestic and international US\$ 1,000,000	- List of requirements needed and priorities in 6 months
(iv). Standard protocols for ex-situ conservation (maintenance of facilities, disease control, quarantine etc).	High	DWLC, FD, National Zoological Gardens, PGRC, National Botanic Gardens & NARA, (Universities Environmental org)	Year 3-4	Domestic and international US\$ 175,000	- Standard protocols prepared in 12 months - Monitoring annually.

Measure/Action 5: Give ex-situ conservation **high priority** and **create awareness** on its importance.

Justification for the action: Ex-situ conservation of wild fauna is not a high priority in the existing conservation related policies. Due to the complexity and high costs involved ex-situ conservation is not considered a high priority in conservation efforts. However, in view of the impending threats due to climate change, due attention needs to be given for ex situ conservation as survival of some species may entirely be dependent on this activity. The importance of ex-situ conservation should be clearly convinced to decision makers so that it is given due priority when allocating annual budgets, drafting strategies and policies.

Action /Sub Action	Priority Rank	Responsibility for Implementation	Time frame	Cost & Funding Source	Indicators
(i) Give ex-situ conservation high priority.	High	Wildlife Dept, Forest dept M/ Environment, Dept of National Zoological Gardens PGRC	Year 1-2	Domestic and international US\$ 200,000	- Changes made to current policy and priorities in 6 months - Two awareness workshops annually with 25-50 stakeholders.
(ii) Create awareness on its importance* <i>(can combine with above activity)</i>	Medium	DWLC, FD, National Zoological Gardens, PGRC, National Botanic Gardens & NARA	Year 1-2	Domestic and international US\$ 150,000	- Two awareness workshops annually with 25-50 stakeholders.
Measure/Action 6: Studies to identify and prioritize species for ex-situ conservation* and climate change modeling to also identify species vulnerable to climate change*					
Justification for the action: Currently there is poor understanding and dearth of information available on species that may require ex-situ conservation (at present or in the future). Perhaps under the present context ex situ conservation is not deemed a priority, but under the impending climate change scenario it would be necessary to have some predictions made to identify species requiring such interventions. This will enable certain facilities to be set up in advance to enable interventions as and when required. Understanding on species that need ex-situ conservation will require a comprehensive analysis on current threat levels and potential climate change impacts on species already under threat. Capacity building, technology transfer etc will be required in this regard.					
Action /Sub Action	Priority Rank	Responsibility for Implementation	Time frame	Cost & Funding Source	Indicators
(i). Studies to identify and prioritize species for ex-situ conservation*	V. High	DWLC, FD, National Zoological Gardens, PGRC, National Botanic Gardens & NARA, CCS of M/E	Year 1-3	Domestic and international US\$ 2,000,000	- A comprehensive study completed in 3 years. - One set of modeling data,

		(Universities Environmental org)			maps etc within 3 years.
(ii). Climate change modeling to also identify species vulnerable to climate change* <i>(can combine with above activity)</i>					

Measure/Action 7: Introduction of a regulated system to allow **ex-situ breeding** by non state sector parties, under the mandatory supervision by government stakeholders (In accordance to the legal system).

Justification for the action: - The existing the laws permit only some government sector institutions to carry out ex-situ conservation debarring non state sector participation. Ex-situ conservation certainly needs government involvement, however not having a mechanism to work with other institutions and the private sector may prevent funds, skills etc that will be essential for effective ex-situ conservation. It is however vital that even if ex-situ conservation is allowed by external parties, it should be under the strict and mandatory supervision of the relevant government department.

Action /Sub Action	Priority Rank	Responsibility for Implementation	Time frame	Cost & Funding Source	Indicators
(i). Introduction of a regulated system to allow ex-situ breeding by other parties, under the supervision of the government stakeholders.	Medium	DWLC, FD, National Zoological Gardens, PGRC, National Botanic Gardens & NARA	Year 2-3	Domestic and international US\$ 1,040,000	- Breeding guidelines, regulations in 12 months. - Monitoring and evaluation

Measure/Action 8: Enforcement of existing laws for improper ex-situ conservation activities*

Justification for the action: Although, ex-situ conservation initiatives by non state parties are rare, there have been instances where small scale private zoos, parks etc have been set up violating or non-adherence to certain legislation. Further, conditions of these facilities were found to be substandard. Therefore enforcement of the respective legal instruments is essential. Therefore, existing laws need to be reviewed and amended as required to enable ensuring appropriate safeguards.

Action /Sub Action	Priority Rank	Responsibility for Implementation	Time frame	Cost & Funding Source	Indicators
(i). Enforcement of existing laws for improper ex-situ conservation activities*	Medium	DWLC, FD, National Zoological Gardens, PGRC, National Botanic	Year 1	Domestic and international	- Prepared strategy in 6 months.

		Gardens & NARA		US\$ 150,000	- Execution of strategy
Total cost for Technology 5				#Approx. US\$ 7.5 million for 10 years	

V. High = Very High; NARA – National Aquatic Resources Research and Development Agency; FD – Forest Department; DWLC – Department of Wildlife Conservation; PGRC – Plant Genetic Resource Centre; CCS – Climate Change Secretariat